Section 10 Direct Take Permit Application

I. Title: Application for a Scientific Research/Enhancement Permit under Section 10(a)(1)(A) of the Endangered Species Act of 1973

II. Date: June 20, 2002

III. Applicants:

Greg Pratschner, Complex Manager
Leavenworth National Fish Hatchery Complex
U.S. Fish and Wildlife Service
12790 Fish Hatchery Road
Leavenworth, WA 98826
Phone: (509) 548-7641
FAX: (509) 548-6263

Chris Pasley, Hatchery Manager
Winthrop National Fish Hatchery
U.S. Fish and Wildlife Service
P.O. Box 429
Winthrop, WA 98862
Phone: (509) 996-2424
FAX: (509) 996-3207

IV. Program Description

Background Information-

The U.S. Fish and Wildlife Service (USFWS) operates three federal fish hatcheries within the upper-Columbia River Basin, Leavenworth, Entiat, and Winthrop National Fish Hatchery ((NFH) the Complex). The Complex was authorized by the Grand Coulee Fish Maintenance Project, April 3, 1937, and reauthorized by the Mitchell Act (52 Stat. 345), May 11, 1938. The Complex hatcheries were constructed by the Bureau of Reclamation (BOR) as fish mitigation facilities for the Grand Coulee Dam, Columbia Basin Project. Although reauthorized by the Mitchell Act, funding was provided through a transfer of funds from the BOR to the Service until 1945. From 1945 through 1993, the Service had funding, management, and operation responsibilities for the Complex. Beginning on October 1, 1993, the BOR assumed funding responsibility for the Complex while the Service continues to manage and operate the three facilities.

Specific fishery objectives which were originally established for the Complex were:

1. *"...to bring, by stream rehabilitation and supplemental planting, the fish populations in the 677 miles of tributary streams between Grand Coulee Dam and Rock Island Dam, up to figures commensurate with the earlier undisturbed conditions and with the natural food supply in the streams."*

2. *"...to produce in addition, by the combination of artificial spawning, feeding, rearing and planting in these streams, a supplemental downstream migration equivalent to that normally produced by the 1,245 miles of streams and tributaries above Grand Coulee Dam."*

Spring chinook salmon *(Oncorhynchus tshawytscha)* and steelhead trout *(O. mykiss)* were identified as the primary mitigation species. The initial operating plan called for adult chinook salmon and summer steelhead to be trapped at Rock Island Dam and hauled to the Leavenworth NFH compound for holding and spawning. Leavenworth NFH was considered the primary adult holding facility and spawning site for the Complex with eggs being shipped from there to Entiat and Winthrop NFHs. Over the years however, fertilized eggs were imported from a variety of sources other than Rock Island Dam to supplement adults returning to each facility. As stated above, part of the mitigation responsibilities of the Complex is to raise and release steelhead. The current steelhead program is located at Winthrop NFH. The program is slated to be ongoing, but for the purpose of this application, the time frame will be years 2002 - 2006 and will be re-addressed at the end of that time. Washington Department of Fish and Wildlife (WDFW) collects adult steelhead at Wells Dam State Fish Hatchery (SFH) and soon after spawning takes place, eyed eggs or fry are transferred to Winthrop NFH.

Winthrop NFH is located near Winthrop, Washington on the Methow River, 72 km above its confluence with the Columbia River. Total distance from the hatchery to the Pacific Ocean is 915 km**,** and nine hydroelectric dams are located within the migration corridor.

Rearing facilities at Winthrop NFH include 34 starter tanks, 46 raceways, and 16 Foster-Lucas ponds. Hatchery water rights total 115,980 L/min. Water sources include two wells, Methow River, and one spring source.

Production goals at Winthrop NFH were set by the Columbia River Fisheries Management Plan under the U.S. v. Oregon decision of 1969. Current goals are 600,000 yearling spring chinook salmon and 100,000 summer steelhead annually

This permit application addresses listed steelhead artificial propagation at Winthrop NFH. Adult steelhead within the Upper Columbia ESU will be intentionally taken at Wells SFH by WDFW and eyed eggs or fry transferred to Winthrop NFH to be reared and released for the purpose of enhancing the population status of the species through artificial propagation at this facility.

A. Program justification

NMFS (1996) state that total abundance of populations within this ESU (Columbia River Basin upstream of Yakima River) has been relatively stable or increasing, this appears to be true only because of major hatchery supplementation programs. They estimate that 81% of spawning escapement in the Methow River is hatchery origin. The major concern for this ESU is the clear failure of natural stocks to replace themselves (NMFS 1996). Given existing conditions, and the likelihood that habitat-related factors adversely affecting steelhead productivity in the Basin will not be remedied in the near future, steelhead in this region are likely at a high risk of extinction if no hatchery intervention occurs (MCMCP 1997). The current steelhead program at Winthrop NFH started in 1995 with eyed eggs being transferred and in 1996, fry were brought to the station from Wells SFH.

Given that extinction of the natural population is likely before natural recovery can occur, USFWS feels that the continued implementation of this supplementation program using the native steelhead population is warranted. We believe that the potential risks posed by artificial propagation to the listed population are out-weighed by its potential to rapidly increase abundance and avoid extinction. The proposed supplementation program is intended to facilitate recovery of the natural population, minimizing the risk of further decline and restricting genetic changes resulting from artificial propagation.

Closure or reduced production of steelhead at Winthrop NFH was considered. Based on the information given above, we believe that steelhead releases and Winthrop NFH operations will not adversely affect listed natural steelhead originating in the Columbia Basin to a significant degree. The hatchery steelhead stock used for this program has been determined to be essential for the recovery of the ESU. The past and present hatchery propagation of steelhead in this region is likely responsible for the existence of the naturally-producing populations in the region today. The proposed supplementation program is believed to be beneficial to the recovery of the species, while habitat factors affecting steelhead abundance in the region are remedied. Therefore, potential actions including closure or reduced production from Winthrop NFH was rejected as an alternative.

B. Program time period

The program will continue until it is deemed that the species is replacing itself naturally or as dictated by other program needs.

C. Cooperators

WDFW will collect the adults at Wells SFH and distribute eyed eggs or fry to Winthrop NFH.

D. N/A

E. See background information, this section.

F. N/A

V. Description of the Purpose of the proposed program:

The purpose of the proposed program is the propagation of the listed species to sustain and recover this population using indigenous broodstock. Additional details regarding the purpose of the program are provided in section IV above.

A. Detailed discussion of procedures and techniques

Broodstock for the Winthrop NFH program is acquired from Wells SFH. Two different transfers could be used:

1. Eyed eggs taken from throughout the run are transferred to Winthrop NFH in egg transport containers loaded in a covered truck in March. Transportation time is approximately one hour. The transferred eyed eggs are placed in vertical stack incubators (6 - 8 gpm/stack) until early May when the resulting fry are moved to eight concrete start-up troughs (15'L x 16.5"W x 12"D). When densities reach a Density Index (DI) of .20, the fry are transferred to the larger (15'L x 3'W x 2'D) fiberglass start tanks. A total of 34 of these tanks will be available if needed. When the DI approaches .20 (mid-summer), the fingerlings are moved outside to two Foster-Lucas (FL) ponds (2750 cu. ft).

2. Fry from eggs taken from throughout the run are transported to Winthrop NFH in July at a size of 180 to 300 fish per pound. Fish are transported from Wells SFH by WDFW personnel using one or two WDFW fish transportation trucks equipped with aeration devices, oxygen tanks, air stones, and recirculation pumps. Transportation time is about one hour. The fry arrive at Winthrop NFH in two different size groups since they were taken from throughout the run. The fry are placed in two FL ponds and brought up to equal size through differing feeding regimes.

At the beginning of September of the same year, under both of the above scenarios, the fry are split and occupy three or four FL ponds, depending on size and density. The fish eventually occupy a total of six FL ponds, maintaining a DI at or below .20 throughout rearing. Flow to each pond is normally around 350 gpm. Water source is screened Methow River water, pumped ground water, or a combination of both. Diet used throughout rearing is Bioproducts moist feed, based on percent body weight and water temperature. All ponds are cleaned daily using the brush and drain method. The fish remain in the six FL ponds until their April release into the Methow River when they average 5 to 8 fish per pound.

1. All steelhead will be adipose fin-clipped to identify them as hatchery origin.

2. The adult fish ladder is located on a channel fed by a spring and overflow from the screen chamber and enters Methow River about 1/4 mile from the hatchery. Juvenile steelhead are allowed to volitionally leave the raceways, after which they enter the channel.

3. N/A

4. See above

5. N/A

B. Potential for injury or mortality and steps taken to minimize adverse effects.

The potential of steelhead reared and released from Winthrop NFH to impact listed stocks in the Columbia and Snake River basins can be incorporated into two categories: 1) the physical, chemical, and micro-biological effects associated with hatchery operations, 2) direct and indirect effects associated with juveniles released from the facility.

Physical, Chemical, and Micro-biological Effects-

The potential for Winthrop NFH operations to adversely effect listed, wild steelhead as a result of water withdrawal, hatchery effluent discharge or the release of juvenile fish is low.

Water Withdrawal

Winthrop NFH has withdrawn up to 75% (up to 50cfs) of its water supply from the Methow River and 25% from ground water supply. This figure (50 cfs) represents about 3% of the mean annual discharge of 1,592 cfs (Mullan et al. 1992). Due to fish health considerations, Winthrop NFH is reducing its use of Methow River water which should further lessen its impacts to listed steelhead. The area effected by this action (from withdrawal to return) is about 2100m in length.

Hatchery Effluent

Effluent from Winthrop NFH is routinely monitored to ensure compliance with NPDS standards and state point source discharge criteria. Winthrop NFH has consistently remained below designated standards for settleable solids. Considering that the effluent from Winthrop NFH complies with EPA standards, coupled with the low percentage of effluent to total discharge (dilution factor), there is a low possibility that this effluent will negatively effect listed steelhead in this region.

Transmission of Disease or Parasites

The primary objective of fish health management programs at USFWS hatcheries is to produce healthy smolts that will contribute to the program goals of that particular stock. Equally important is to prevent the introduction, amplification or spread of certain fish pathogens which might negatively affect the health of both hatchery and naturally producing stocks. USFWS fish health biologists routinely assess the health of salmonids produced at Complex hatcheries. At least once per month, biologists sub-sample ponds at each hatchery to determine Bacterial Kidney Disease (BKD) levels using the ELISA technique, overall health, parasites, and the possible occurrence of other viral or bacterial infections. Under Service fish health policy, fish at federal hatcheries must be destroyed and their remains buried if they are diagnosed with viral diseases not endemic to the country or that threaten the continued existence of fish populations. To further

reduce the potential of disease transmission, it is Complex policy to bury all adult carcasses, mortalities among ponded juveniles, and dead or fungous eggs. The broodyears of steelhead raised thus far at Winthrop NFH have had very good health throughout their hatchery life. Winthrop NFH is reducing its use of river water in favor of disease-free well water. This should further improve the disease status of their fish and reduce potential impacts to other stocks.

Effects Associated with Released Juvenile Steelhead-
Competition, Predation, Residuals, and Behavior

Direct competition for food and space between hatchery and natural fish may occur in spawning/or rearing areas, the migration corridor, and ocean habitat. SIWG (1983) reported a high risk of ecological resource competition between hatchery steelhead and wild steelhead juveniles where they overlap in freshwater occurrence. These impacts are assumed to be greatest in the spawning and nursery areas and at points of highest fish density (release areas) and to diminish as hatchery smolts disperse (MCMCP 1997). Release of hatchery smolts that are physiologically ready to migrate is expected to minimize competitive interactions as they should quickly migrate out of the spawning and rearing areas (NMFS 1995). Competition continues to occur at some unknown, but probably lower level as smolts move downstream through the migration corridor (MCMCP 1997).

Rearing and release strategies are designed to limit the amount of ecological interactions occurring between hatchery and naturally produced fish. Fish are reared to sufficient size that smoltification occurs within nearly the entire population, which reduces retention time in the streams after release (Bugert et al. 1991). Hatchery produced smolts emigrate seaward soon after release, minimizing the potential for competition with wild fish (Steward and Bjornn 1990). Witty et al. (1995) state they did not find any literature or data to demonstrate functional relationship between numbers of juvenile migrants moving through reservoirs and impacts on smolt survival attributable to competition.

Hatchery fish may prey upon natural fish. Due to their location, size, and time of emergence, newly emerged chinook salmon fry are likely to be the most vulnerable to predation by hatchery released fish (USFWS 1994). Emigration out of hatchery release areas and foraging inefficiency of newly released hatchery smolts may minimize the degree of predation (USFWS 1994). SIWG (1984) reported that there is an unknown risk of predation by hatchery steelhead on wild steelhead juveniles where they interact in freshwater migrational areas. The group also noted that predation may be greatest when large numbers of hatchery smolts encounter newly emerged fry or fingerlings, or when hatchery fish are large relative to wild fish. Due to their location in the upper portions of the drainages and later time of emergence (late spring through August (MCMCP 1997)), wild steelhead fry are not likely to be vulnerable to predation by hatchery smolts.

Witty et al. (1995) conclude that the potential impact of hatchery salmonid predation on natural salmonids in the mainstem corridor is not a significant factor. Steward and Bjornn (1990) state that large concentrations of hatchery fish may adversely affect wild juveniles by stimulating functional responses from bird and non-salmonid fish predators. On the other hand, a mass of fish

moving through an area may confuse or distract predators and may provide a beneficial effect (MCMCP 1997).

Hatchery-reared salmon and steelhead released into spawning and rearing areas of natural species may fail to emigrate (residualize), and may negatively interact with natural fish (MCMCP 1997). Pearsons et al. (1994), state that residual hatchery steelhead predation on wild salmonids may be a concern regarding the health of wild steelhead populations. The rate of steelhead residualism is thought to average 5 to 10% of the number released (NMFS 1995). Complex hatchery releases are timed to mimic the outmigration of naturally produced salmon to further reduce potential residuals.

Large hatchery steelhead release concentrations may cause displacement of rearing wild steelhead juveniles from occupied stream areas, leading to abandonment of advantageous feeding areas, or premature out-migration. Pearsons et al. (1994) reported displacement of juvenile wild rainbow trout from discrete sections of streams by hatchery steelhead released into an upper Yakima River tributary, but no large scale displacements of trout were detected. They noted that these behavioral interactions between hatchery reared steelhead did not appear to have a significant impact on the trout populations examined, however, and that the population abundance of wild salmonids did not appear to have been negatively affected by releases of hatchery steelhead. Volitionally releasing steelhead smolts from Winthrop NFH will help decrease density dependant effects on wild fish, such as niche displacement and "pulling" leading to premature migration.

The interaction between hatchery and wild-origin listed steelhead in the tributaries and mainstem areas may lead to fish pathogen transmission. This transmission has the potential to occur from release locations downstream, throughout the migration corridor. Although hatchery populations are considered to be reservoirs for disease pathogens, there is little evidence to suggest that diseases are routinely transmitted from hatchery to wild fish (Steward and Bjornn 1990).

VI. Description of the Listed Species of Concern:

This application is submitted in response to the August 11, 1997 listing by the National Marine Fisheries Service (NMFS) of Upper Columbia River steelhead as " Endangered" under the ESA. This steelhead population utilizes the upper and lower Columbia, and the Columbia River estuary, as juvenile rearing areas and as migration corridors both as smolts and as returning adults. Activities proposed under this permit application pertain to the upper Columbia River portion of the species range.

Adult summer steelhead migrate upstream in this region in fall and spring, spawning occurs in late March to July, eggs incubate in late March to late spring, and fry emerge in late spring to August. Fry and small parr disperse downstream in late summer and fall. Fry and parr rear all year, and smolts migrate out of the region in March to early June (Chapman et al. 1994). Upper Columbia River steelhead predominately smolt at age two. Most spend 1 - 2 years in the ocean, and some

spend up to a year in fresh water before spawning (NMFS 1996). Wells Dam SFH stock is considered essential in the rebuilding effort of upper Columbia River steelhead. Adult steelhead are collected from the fish-ways at Wells Dam between August and October and spawned from January through early February. This stock is distributed throughout the area including to Winthrop NFH.

A. Level of Take

1. 120,000 steelhead eyed eggs or fry taken through adult collection by WDFW at Wells SFH will be transferred to Winthrop NFH. These steelhead are part of the "Upper Columbia River" ESU**.**

2. N/A

B. Physical description of animal to be taken

See section V - A.

C. Dates and location of take

See section V - A.

D. Description of stock status

See section IV - A and above

E. Description of the manner of taking

N/A

F. Names and qualifications of persons capturing of taking listed steelhead

N/A

G. Use of contractors

None

VII. Description of Transportation Manner for Animals Taken, Imported, Exported, or Shipped in Interstate Commerce.

USFWS has no plans to take, import, export, or ship any listed steelhead in interstate commerce as part of this permit application.

VIII. Description of Care and Maintenance of Listed Steelhead.

A. Dimensions of holding facilities

See section V. - A

B. Water supply, amount, and quality

See sections IV. and V. - A

C. Fish diet, amount, and type

A high quality, fish meal-based, artificial moist feed (Bioproducts) will be used to rear juvenile steelhead to smolt size at the facility. The size of feed and amount fed each day will depend on fish size and water temperature.

D. Sanitation practices

All ponds are cleaned daily using the brush and drain method.

E. Qualifications and experience of staff

The hatchery program that is the subject of this permit application is managed and operated by the U.S. Fish and Wildlife Service. All individuals involved in the activities described in this permit application are employees of USFWS, and are therefore acting under the authority of the agency. Personnel involved in the propagation of listed steelhead at Winthrop NFH include USFWS fisheries biologists, fishery technicians, and hatchery managers. All individuals participating in the program are professionally trained in methods that allow for the safe and effective propagation of listed steelhead. The names and qualifications of the individuals directly involved in the propagation of the listed species are presented below.

Chris Pasley, GS-11 - Hatchery Manager. B.S. in Fisheries Biology, Humbolt State Univ.
18 years aquiculture experience.

Mark Ahrens, GS-9 - Asst. Hatchery Manager. B.S. in Fisheries Biology, Univ. of Wash.
7 years experience in aquiculture.

Robert Adams - Fish Culturalist. 17 years hatchery experience.
Chris Dammann - Fish Culturalist. 3 years hatchery experience.
Dan Ryals - Fish Culturalist. 5 years hatchery experience.

IX. Statement of Willingness to Participate in a Cooperative Breeding Program

USFWS is willing to participate in a cooperative breeding program for Upper Columbia River steelhead and maintain or contribute data to a breeding program.

X. How the Program will Enhance and Benefit the Wild Population

As stated previously, NMFS concluded that the naturally produced steelhead population in

the Upper Columbia River region is clearly not replacing itself (NMFS 1996). Total abundance of steelhead within the ESU has been relatively stable or increasing in recent years only because of hatchery supplementation programs (NMFS 1996). Hatchery production has strongly dominated spawning escapements. This ESU might not exist today if there were not hatchery production based on indigenous Upper Columbia region steelhead stocks (NMFS 1996).

Continuation of the steelhead supplementation program described in this permit application will help ensure that the Upper Columbia steelhead population is preserved and restored in the region until major habitat-related factors affecting the productivity and survival of wild fish can be remedied.

Returning adults from WNFH juvenile releases are collected at Wells Dam and/or are allowed to spawn naturally.

XI. Information Regarding All Endangered or Threatened Species Captured or Maintained

A. Identification of any previous permits obtained to work with endangered or threatened species.

#1118 - NMFS

B. Endangered or threatened species taken since the species were listed.

None

C. Take levels for other salmon species.

Other salmon species collected and propagated at USFWS-managed hatcheries in the upper Columbia River region include spring chinook and the acclimation and release of coho salmon. Mortalities associated with these species in hatchery operations can result from handling injuries, fungal infection, and various types of fish diseases. Also see section V. B.

D. Steps taken to avoid or decrease mortalities.

Mortalities experienced for other species captured and reared in Upper Columbia region hatcheries have been within normal expected levels. Mortalities associated with adult collection operations have been low, due to frequent monitoring and careful handling of captured fish. Fish disease out-breaks among juvenile fish reared at the hatcheries are minimized and controlled in accordance with IHOT (1995) and USFWS Fish Health Policy and Implementation Guidelines.

XII. Certification:

"I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand that this information is submitted for the purpose of obtaining a permit under the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.) and

regulations promulgated thereunder, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or to penalties under the Endangered Species Act of 1973."

XIII. Name, Title, and Signature of Applicant:

Certified by_____ Date:_____

Greg Pratschner
Complex Manager
Leavenworth National Fish Hatchery Complex
U. S. Fish and Wildlife Service
Leavenworth, WA 98826

References

Bugert, R., K. Petersen, G. Mendel, L. Ross, D. Milks, J. Dedloff, and M. Alexandersdottir. 1991. Lower Snake River Compensation Plan, Tucannon spring chinook salmon evaluation program. Report to U.S. Fish and Wildlife Service, Cooperative Agreement 14-16-0001-91534. Washington Dept. Fish and Wildlife, Olympia, WA.

Chapman, D., C. Peven, T. Hillman, A. Giorgi, and F. Utter. 1994. Status of summer steelhead in the mid-Columbia River. Don Chapman Consultants, Inc. Boise, ID.

MCMCP (Mid-Columbia Mainstem Conservation Plan). 1997. Hatchery program - working draft (24) July 1997. Washington Dept. Fish and Wildlife, Olympia, WA.

Mullan, J. W., K. R. Williams, G. Rhodus, T. W. Hillman, and J. D. McIntyre. 1992. Production and habitat of salmonids in mid-Columbia River tributary stream.
U.S. Fish and Wildlife Service Monograph I. 489 pp.

National Marine Fisheries Service. 1995. Biological Opinion for 1995 to 1998 hatchery operations in the Columbia River Basin. NOAA/NMFS, April 5, 1995. 82 pp.

National Marine Fisheries Service. 1996. Status review of west coast steelhead from Washington, Idaho, Oregon, and California. NOAA Tech. Memo. NMFS-NWFSC-27. National Tech. Information Service, U.S. Dept. of Commerce. Springfield, VA. 261 pp.

Pearsons, T.N., G.A. McMicheal, S.W. Martin, E.L. Bartrand, M. Fischer, and S.A. Leider. 1994. Yakima River species interactions studies - annual report 1993. Project No. 89-105. Bonneville Power Administration, Portland, Oregon. 247 pp.

SIWG (Species Interaction Work Group). 1984. Evaluation of potential interactions effects in the planning and selection of salmonid enhancement projects. J. Rensel, chairman and K. Fresh editor. Report prepared for the Enhancement Planning Team for implementation of the Salmon and Steelhead Conservation and Enhancement Act of 1980. Washington Department of Fish and Wildlife. Olympia, Washington. 80 pp.

Steward, C. R., and T.C. Bjornn. 1990. Supplementation of salmon and steelhead stocks with hatchery fish: a synthesis of published literature. Tech. Rpt. 90-1. Idaho Cooperative Fish and Wildlife Research Unit. University of Idaho, Moscow, ID.

U.S. Fish and Wildlife Service. 1994. Biological assessments for operation of USFWS operated or funded hatcheries in the Columbia River Basin in 1995 - 1998. Submitted to NMFS, Portland, OR.

Witty, K., C. Willis, and S. Cramer. 1995. A review of potential impacts of hatchery fish on naturally produced salmonids in the migration corridor of the Snake and Columbia rivers. Comprehensive Environmental Assessment - Final Report. S.P. Cramer and Associates. Gresham, OR. 76 pp.